INVESTIGATING THE FACTORS AFFECTING THE PERFORMANCE OF CONSTRUCTION PROJECT IN AKWA IBOM STATE

BY

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05/EV/QS/191

DEPARTMENT OF QUANTITY SURVERYNG

FACULTY OF ENVIRONMENTAL STUDIES

UNIVERSITY OF UYO

APRIL, 2011

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05/EV/QS/191

In Partial Fulfilment of the Requirement for the Award of the Degree of Bachelor of Science (B.Sc.) In Quantity Surveying

DEPARTMENT OF QUANTITY SURVEYING

FACULTY OF ENVIRONMENTAL STUDIES

UNIVERSITY OF UYO

APRIL, 2011

CERTIFICATION

This is to certify that the work reported in this book is the personal work of ISANG, INIMBOM WALTER with registration number; 05/EV/QS/191. All omissions and commissions in this work are those of the student.

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DEDICATION

I dedicate this work to the Almighty God who has given me the strength to successfully complete this programme, and then to my only Mother Mrs Ekaette Udofia, my Sister Miss Anyanime Walter. Thanks for your love and support.

ACKNOWLEDGEMENTS

I take great pleasure in expressing my sincere gratitude to the almighty God who, in spite of all odds still gave me the strength to complete the study. I am particularly grateful to my project supervisor, Mr Christian Asuquo for his patience, tolerance and for suggesting possible ways of improving upon my study.

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ABSTRACT

This research work was carried out to investigate the factors affecting the performance of time, cost and quality as well as the effect of poor performances on construction projects in Uyo and Okobo Local Government Area of Akwa Ibom State. To achieve the set objectives of this study, both primary and secondary sources of data collection were employed. The principal form used was a well structured questionnaire which was analysed using index, frequencies and percentages. Analysis of the study reveals that inadequate budget and financial problems, increase in the cost of materials and procurement of low quality materials are the three major factors that affects the performance of time, cost and quality respectively, while abandoning of projects was indicated as the main effect that poor performance has on construction projects. Conflicts and disputes among parties to the contract, professional reputation of the construction team adversely affected and escalation of project cost were also found to be the effect of poor performances on projects. The study concluded by recommending the availability of adequate funds, provision for fluctuations, procurement of specified materials, effective planning and supervision, elimination of politics in construction projects, setting performance targets and adequate communication between clients, consultants and contractors as these will increase the overall performance of construction projects.

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CHAPTER ONE

1.0 INTRODUCTION

1.1 BACKGROUND TO THE STUDY

The construction project of the 21st Century in Nigeria in general and Akwa Ibom State in particular is becoming a more complex process that spans many phases; is technologically driven, has many stakeholders and involves new types of client's finances and objectives with a tendency to expedite projects. This has resulted in changes in the construction work thereby affecting the client, the parties involved, the methods employed and the construction industry in general.

Recent studies in some countries support the fact that construction clients are dissatisfied with project outcomes due to inability to meet their expectations in terms of timely project delivery, completion within the agreed budget, satisfying and achieving the standard quality of work they require. Project performance and delivery have been of great concern and they are influenced by environmental factors such as the topography and strength of the soil, underground moisture, deferring site and inclement weather conditions etc along with the interactions and interrelationships of various stakeholders, project owners and between the constructors and the consultants.

Time, cost, quality target and participation satisfaction have been identified as the main criteria for measuring the overall success of construction projects (Dissanayaka and Kumaraswamy, 1999). Of these, cost and time tends to be the most important and visible and always considered as very critical because of their direct economic implications if they are unnecessarily exceeded. Moreover, the client's sudden change of plans, financial problems and substitution of construction materials due to their specific objectives has been linked as one of the areas hindering the performance of construction projects. Contractors also have to contend with fluctuations in the price of building materials, equipments and labour which in turn affects the overall cost, quality and time performance of projects.

The Nigerian construction industry today is bedevilled by the fact that almost all projects are completed after a duration much longer than initially planned. This was buttressed by Odusami and Olusanya (2000) who concluded that projects executed in the Lagos metropolises experienced an average delay of 51% of planned duration for most projects. The result of a survey conducted by the Nigerian Institute of Quantity Surveyors in 1981 showed that construction costs in Nigeria were about as 40% more expensive than the same type of construction in

Kenya and Brazil, 35% more than in Britain and 30% more as compared with the United States of America. In Nigeria, apart from investigating the causes and implications of time overrun, little work is known to have been done to predict time, cost and quality performance and Clients are becoming uncomfortable at seeing their projects completed after longer duration, at a higher price and below their stated standard. Efforts geared towards improving construction performance and efficiency by means of cost-effectiveness, timeliness and standard quality would be worthwhile and will certainly contribute to cost savings, not only to the clients, but also to the country as a whole.

This study therefore attempts to investigate the factors affecting the performance of construction projects so as to hedge against future poor performances of construction projects. It is on this background that this research will be carried out.

1.2 STATEMENT OF THE PROBLEM

Construction projects in Nigeria are mostly characterized by time, cost overrun and substandard quality of work. This phenomenon poses a big threat to the client, the contractor and the industry. The consequences of these have been marked with poor performances on projects which have manifested in serious dispute between the client, the consultant and the contractor, delays in project delivery, failures and low quality of building

structures, abandoning of projects and all of these have greatly reduced the efficiency in the construction industry. Moreover, the economy and other social aspects have been affected due to the fact that the industry provides the basic amenities needed for survival.

Therefore, to curb these inherent problems outlined above, an investigation on the basic factors affecting the performance of construction project is highly indispensable.

1.3 RESEARCH QUESTIONS

The following research questions were developed for the study;

1) What are the key factors that affect time performance of projects in the construction industry?

2) What are the factors that affect the performance of cost in construction works?

3) What are the factors that affect the performance of quality in construction projects?

4) What are the effects of poor performance on construction projects?

1.4 AIM AND OBJECTIVES OF THE STUDY

The main aim of this research is to investigate the factors that affect the

performance of construction projects.

The specific objective of this research is to;

(1) Identify and examine the factors affecting time performance.

(2) Identify and examine the factors affecting cost performance.

(3) Identify and examine the factors affecting quality performance.

(4) Examine the effect of poor performance on construction projects

1.5 SCOPE OF THE STUDY

The study is limited to construction projects executed in Uyo Capital City and Okobo Local government Area of Akwa Ibom State.

The study considers Building and Civil Engineering construction projects.

1.6 IMPORTANCE OF THE STUDY

The performance of numerous construction projects in Akwa Ibom State have been much concern to all. Public and private project owners have invested an appreciable amount of money on projects with little improvement. A study of this nature will definitely optimize the efficiency of construction projects and reduce the rate of sub-standard quality of work.

It will pinpoint the areas of poor performances in the execution of

projects that will improve the cost, quality and time paradigm and help keep it at an agreeable balance between the client, the consultant and the contractor.

These benefits would save the client the extra expenses incurred due to cost overruns delays in projects. It will assist project managers in planning and managing construction programme and to achieve a high level of performance in the proper way. It will also help the contractor to effectively use his resources and establish an acceptable level of quality. The ideas arising from this work will also improve the overall performance of the industry as well as reducing the rate of poor performance of construction projects.

1.7 STRUCTURE/PLAN OF THE STUDY

The study report is organized into five chapters. Chapter one is the introduction, chapter two dwells on review of relevant literature, chapter three presents the research methodology while chapter four discusses presentation of data analysis and closely followed by chapter five which summarizes, concludes and makes recommendations.

CHAPTER TWO

LITERATURE REVIEW

2.0 INTRODUCTION

This chapter highlights the contributions made by different authors and researchers on the factors affecting the performance of time cost and quality in construction projects. This comprehensive analysis of literatures containing relevant information provides a platform and foundation on which the theoretical framework of this study is based.

2.1 BASIC CONCEPTS

The following terms are applicable to this study;

2.1.1 DEFINITION OF A PROJECT

According to Hackett, Robinson and Statham (2005), a project is an elaborate activity that makes use of resources and has a beginning and an end. In other words, it is a temporary endeavour undertaken to create a unique product or services. Temporary means that every product has a beginning and a definite end.

Temporary does not necessarily mean short in duration, many projects last for several years. In every case however, the duration of a project is finite as projects are not ongoing. In addition, temporary doesn't generally

apply to the product or services created by the project. Most project are undertaken to create a lasting result. For example, a project to erect a National stadium will create a result expected to last for centuries, likewise the project of building an International Airport (AKIA).

Unique means that every product or service is different in some distinguishing way from other similar product or services. Projects are undertaken at all levels of organization, they may involve a single person or a huge number and can require less than 100 hours to complete or over 10,000,000 hours. An example of a typical construction project is the Roundabout/Flyover project at Itam Junction by Julius Berger Company limited.

Projects involve doing something which has not been done before and which is therefore, unique. Examples; many thousands of office buildings have been erected, but each individual facility is unique – Different owner, different design, different location and different contractors and so on. The repetitive nature of the elements does not in any way change the fundamental uniqueness of the overall effort, because the product of each project is always unique in its own way (Hackett et al, 2005).

2.1.2 PROJECT PERFORMANCE

Performance can be considered as an evaluation of how well individuals, groups of individuals or organizations have done in pursuits of specific objectives which generally revolves around satisfying key stakeholders. Measures of performance vary significantly, and in construction, typically it includes construction cost, construction time, cost and time predictability, client satisfaction with product and services, defects, profitability, productivity and safety (DTI 2005).

The satisfaction level of the client in terms of quality with project outcomes can be used as one as one of the yardstick of performance, (The others being cost and time). Satisfaction is defined in Ankrah et al (2005) as the level of 'happiness' of people affected by the project including key participant. It is an attribute of success which is both dependent on performance and personal standards or expectations. Satisfaction is thus a subjective assessment of performance.

2.1.3 TIME

According to Chan (2001), time is the duration for completing a project. It is scheduled to enable the building or a structure to be used by a date determined by the client's future plans. Effectiveness is a measure of how well a project is implemented or the degree to which targets of time

and cost is determined from the start-up phase to full production. From Naoum (1994) and Chan (1997), time can be measured in terms of construction time, speed of construction and time overrun.

- Construction time is the absolute time that is calculated as the number of days/weeks from start on site to practical completion of the project.
- Construction time = Practical completion date – Project commencement date
- Speed of construction is the relative time, which is defined by the gross floor area divided by the construction time.

$$\text{Speed of construction} = \frac{\text{Gross floor area (m2)}}{\text{Construction time (day or week)}}$$

- Time variation is measured by the percentage of increase or decrease in the estimated project in days/weeks discounting the effect of Extension of Time (EOT) granted by the client.

$$\text{Time variation} = \frac{\text{Construction time} - \text{Revised contract period}}{\text{Revised contract sum}}$$

Where Revised contract period = Original contract period + EOT

2.1.4 COST

Cost performance evaluates the degree to which the general conditions promote the completion of a project within the estimated budget (Bubahit

and Almhawis, 1994). Cost is an amount provided for work for a construction project. Cost is not only confined to the tender sum or the contract sum only, it is the overall cost that a project incurs from inception to completion. So it includes any costs arising from fluctuations, variations, modifications during construction and the cost created by legal claims, such as litigation and arbitration. When this cost exceeds the initial contract or tender sum due to these additional costs, the term 'cost overrun' is often used (Chan, 2001).

2.1.5 QUALITY

Chan (2001) defined quality in the construction industry as the totality of features required by a product or services to satisfy a given need; fitness for purpose. Nowadays, quality is the guarantee of the products that convince the customers or the end users to purchase or use. Specification is one of the criteria that were advocated by Songer et al. (1996) and Walteridge (1995). They defined it as the workmanship guidelines provided to contractors by clients or the client's representative at the commencement of project execution.

The measure of technical specification is to what extent the technical requirements specified can be achieved. Actually, technical specification is provided to ensure that buildings are erected to good standard and by proper procedure. Freeman and Beale (1992) extended the definition of

technical performance with scope and quality. So, meeting technical specification is grouped under the 'quality' category and when it fails below the client's expectation or satisfaction upon the completion of a project, it is often referred to as "substandard quality of work".

2.2 THE PERFORMANCE OF CONSTRUCTION PROJECTS

Almost every industry is dynamic in nature and the construction industry is no exception. Its environment has become more dynamic due to the increasing uncertainties in technology, budgets and development processes. A building project is completed as a result of a combination of many events an interactions, planned or unplanned over the life of a facility, with changing participants and processes in a constantly changing environment (Sanvido et al. 1992). Ashely et al. (1987), on the other hand investigated the factors used to evaluate project success and the impacts of contractor selection method and performance on projects. An overview of the reasons for performance based on bringing together the views of different practitioners involved in the construction industry to provide an improved understanding of the problems and subsequently if addressed, will result in improvements in the performance of future construction projects have also been addressed and evaluated through performance measures.

2.2.1 CHANGING MEASURES OF PERFORMANCE OVER THE YEARS

Over the years, a number of researchers have shown interest. As reported in Chan (2001), Chan (1997) undertook a comprehensive review of the measurement of project success in the late 80's and early 90's. In the early 90's, project success was inherently tied to performance measures which in turn were tied to project objectives. At project level, success was measured on the basis of time, monetary cost and project performance. Time, cost and quality are the basic criteria to project success or performance. Nearly every related article mentions these three and points out their importance in a construction project. Atkinson (1999) cited in Chan (2001) identified these three criteria as the 'Iron Triangle'. Atkinson further suggests that while some different definitions about project management have been made, the criteria for success, namely; time, cost and quality remains and are all included in the actual description.

Lim and Mohamed (1999) cited in Chan (2001) believed that project success should be viewed from different perspective of the individual owner, developer, contractor, users and the general public. Two categories; the macro and micro viewpoint of project were proposed.



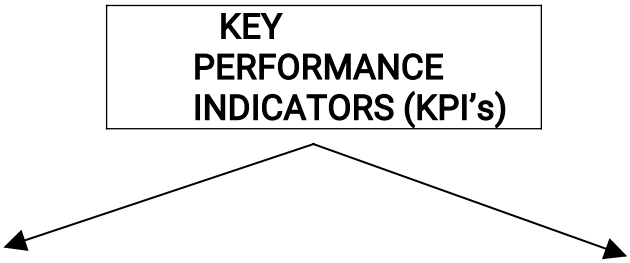
MICRO VIEWPOINT	MACRO VIEWPOINT
Completion	**Completion**
➢ Time	➢ Time
➢ Cost	➢ Satisfaction
➢ Quality	➢ Utility
➢ Performance	➢ Operation
➢ Safety	

Figure 2.1; Micro and Macro viewpoints of project success

Source; Lim and Mohamed (1996) as reported in Chan (2001)

2.2.2 KEY PERFORMANCE INDICATORS (KPI)

The purpose of the key performance indicators (KPI) is to enable the measurement of project an organizational performance throughout the construction industry (KPI working group, 2000). With this purpose in mind, a range of KPI's to measure the performance of a construction project was developed, both objectively and subjectively. With proper reference made to Chan's (1997) and Naoum's (1994) earlier research as reported in Chan (2001), the measures of the suggested KPI's are mainly divided into two groups and figure 2 provides a pictorial presentation of the KPI's.



Objective Measures	Subjective Measures
➢ Construction time	➢ Quality
➢ Speed of construction	➢ Functionality
➢ Time variation	➢ Client's satisfaction
➢ Unit cost	➢ End-User's satisfaction
➢ Percentage Net variation over final cost	➢ Construction team's satisfaction
➢ Environmental Impact Assessment (EIA) scores	➢ Design team's satisfaction
➢ Accident rate	

Figure 2.2; Key Performance Indicators for project success

Source; Chan (2001)

The review of leading journals on project success as shown above reveals that though other subjective measures such as safety and satisfaction among others are attracting increasing attention; time, cost and quality remains the three basic and the most important performance indicators in construction project. A closer look at the "Iron Triangle" will now be made here.

2.3 TIME PERFORMANCE

Construction time has always been seen as one of the benchmarks for assessing the performance of a project and the efficiency of the project

organization. Timely completion of a construction project is one goal of both the client and the contractor because each party tends to incur additional costs and lose potential revenues when completion is delayed. Chan and Kumaraswamy (1996) cited in Ogunsemi and Jagboro (2005), opined that a project is usually regarded as successful if it is completed on time, within budget and to the level of quality standard specified by the client at the beginning of the project.

Therefore, severe criticisms are always generated when construction projects take far longer than planned. The estimation of time has continued to be a problem of great concern to both researchers and contractors. The Nigerian Construction Industry today is bedevilled by the fact that almost all projects are completed after a duration much longer than initially planned. This was buttressed by Odusami and Olusanya (2000) cited in Ogunsemi and Jagboro (2005) who concluded that projects in the Lagos metropolises experienced an average delay of 51% of planned duration for most projects.

The problem of project time overrun is also of international concern. In Australia, it was discovered that seven-eighths of building contracts surveyed in the late 1960's were completed after scheduled completion while in Hongkong, 70% of building projects were delayed. Moreover, in a

study conducted in Saudi-Arabia in 1995, a cross-section of contractors agreed that 37% of all their projects were subject to delay while consultants admitted that delayed projects accounted for 84% of projects under their supervision. All these have made construction projects one of the most visible 'failure modes' attracting criticism on the industry's profile (Ogunsemi and Jagboro, 2005).

2.3.1 CAUSES OF TIME OVERRUNS

Several factors are responsible for time overruns in construction projects. These can be categorized as follows;

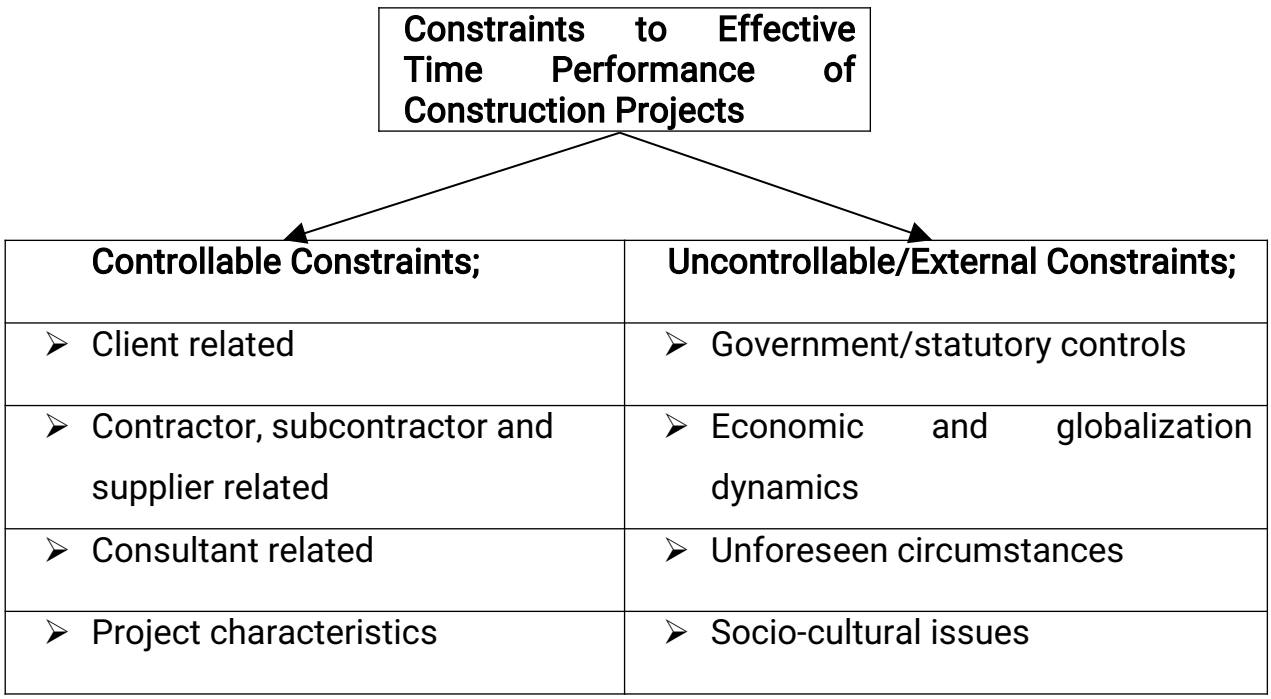


Figure 2.3; Broad categories of constraints to effective time performance of construction projects

Source; Mbachu (2007)

2.3.2 CLIENT-RELATED CONSTRAINTS

According to Mbachu (2007), the analysis of client related constraints which leads to time overruns in construction projects shows that frequent changes to the scope of work especially at critical stages of the implementation process, delayed payments for works duly completed, insistence on preferred procurement route even when it is not appropriate, impatience and not allowing sufficient time for feasibility studies, detailed design and planning before inviting tenders all amounted to time overrun from the client's perspective. In this context Mbachu (2007), opines that changing the project requirements after much of the basic planning was performed and without a corresponding change in other variables could result in an inability to effectively estimate and control project deliverables.

Other factors such as unclear scope of work (inability to comprehensively articulate and communicate project needs and requirements), insufficient funding to ensure progress and timely completion and undue interference at the construction stage were perceived as the most influential constraints to time performance.

2.3.3 CONTRACTOR, SUBCONTRACTOR AND SUPPLIER'S CONSTRAINTS

For the contractor and subcontractor, cash flow problems arising from lack of fiscal discipline along with a lack of credit worthiness with suppliers and lenders exert the most negative influences on timely project delivery. Other constraints include lack of proper coordination of own workforce, inadequate supervision, monitoring and control, over capacity (handling too many jobs at the same time), poor management of occupational safety and health issues resulting in costly disruptive accidents and associated penalties.

On the other hand, delays in the supply of materials, components and equipment, supply of defective materials, insistence on upfront payments and misunderstanding of material specification and other associated errors during supply all constitutes the supplier's worst influences on time performance (Mbachu, 2007).

2.3.4 CONSULTANT RELATED CONSTRAINTS

The designer's most constraining influences are associated with poor needs assessment including the inability to clearly articulate the client's needs and requirements and future changes. This is not surprising, as without proper briefing and feasibility analysis, the planning will be based

on inadequate information. Other constraints include buildability problems (design not compatible with the contractor's method and equipment), lack of flexibility in design to efficiently accommodate the client's late changes and multi-tasking; being involved in too many jobs at the same time (Mbachu, 2007).

2.3.5 PROJECT CHARACTERISTICS

According to Mbachu (2007), innovation/uniqueness, buildability issues and specification problems, difficulties arising from project size /scope of work accompanied with levels of expectations among stakeholders (conflict of interest) along with site characteristics and environmental constraints such as subsoil conditions, terrain, harzards, site location, access, site restrictions, availability of technology/resources (labour, capital, plant and materials) and social, statutory, legal, political or planning requirements for the type of project all constitutes the most influential project characteristics that impact negatively on time performance. Mbachu also observes that if specifications are not clear, inconsistent or incomplete, they become a source of uncertainty and risk which could undermine timely delivery.

2.3.6 UNCONTROLLABLE CONSTRAINTS

The most influential uncontrollable/external constraints include government/statutory control mechanisms comprising rules and regulations impacting on construction resources and progress (monetary

and fiscal policies etc), delays in giving project approvals by local authorities, town planning laws, building regulations and too much prescriptive and overbearing enforcement of regulations.

Others include inflation, unforeseen circumstances such as delays arising from destruction and/or stoppages associated with site conditions, inclement weather conditions, and natural hazards etc. Socio-cultural issues like demoralization due to industrial action, health issues (Cancer, HIV/AIDS), attitude to work, alcoholism, vandalism, conflicts, disputes, xenophobia and racial tension can all hinder time performance and on-time project delivery (Mbachu 2007).

2.3.7 SUGGESTED WAYS OF IMPROVING TIME PERFORMANCE

According to Mbachu (2007), the most effective strategy was perceived to be the minimization of late changes by clients and consultants through adequate briefing and appropriate feasibility studies. This confirms the observation of Rowlinson (1999), who stated that decisions made at the outset of a project are most crucial to a successful project outcome. Other relevant strategies include;

- Effective planning; adequate time should be allowed for planning and verification of key facts at the outset.

- Minimization of cash flow problems by making sure that adequate funds are available before the commencement of a project and that works duly completed are promptly paid for.
- Award of contract should be based on capability, rather than the lowest tenderer.
- Adequate project supervision by project managers and contractors.
- Provision of easy access to project finance for contractors and continuous training along with development of the workforce.

2.4 COST PERFORMANCE

The concept of cost is the second important criteria in assessing the success or performance of a construction project. Construction cost tends to be very important and is always considered as very crucial because of its direct economic implications if it is unnecessarily exceeded (Ogunsemi and Jagboro, 2005). The construction expenditure accounts for about 50% of the Nigerian Government's expenditure. The result of a survey conducted by the Nigerian Institute of Quantity Surveyors in 1981 showed that construction cost in Nigeria were about 40% more expensive than the same type of construction in Kenya and Brazil, 35% more than in Britain and 30% more as compared with the United States of America.

In more recent work, Eden et al. (2005) mentioned that public projects are prone to have massive overruns compared to other construction projects. However, other construction project are also prone to overruns attributing these problems to factors such as poor project management practice, government policies, economic factors and natural environmental issues. Love et al. (2000) lends credence to this fact by attesting that 'failure to apply adequate or appropriate project management tools technique results in overruns, which in turn leads to re-work due to the absence quality tools and techniques essential for time performance'.

Admittedly, the fact that one of the first questions asked by a client who wants a building or structure erected is normally, "How much will it cost?" and if the client is wise, the next question will be "How accurate is this figure?" goes a long way in showcasing the importance of cost in a construction project. In Nigeria, construction project are almost synonymous with cost overruns, therefore efforts geared towards improving construction efficiency by means of cost-effectiveness will be worthwhile and will certainly contribute to cost performance and savings for the construction industry and the country as a whole (Ogunsemi and Jagboro, 2005)

2.4.1 CAUSES OF COST OVERRUNS

The factors identified as the causes of cost overruns can be classified

as follows;

- Contractor – related problems
- Material – related problems
- Client's – related problems

2.4.2 CONTRACTOR – RELATED PROBLEMS

According to Salama et al. (2007), this can arise from cash problems experienced by the contractor during the construction stage of the project thereby hindering the progress and performance of the project. The cost of corrective or remedial work following a fault of the contractor ordered by the consultant or the client due to a lack of communication and coordination between the parties will definitely incur additional cost and will lead to cost overrun. Inaccurate planning and budgeting, the degree of complexity of the project under construction (e.g an Airport construction), structural design corrections made by the consultant on poor design thereby changing the entire design will all affect the cost performance. Other factors occurring during the initiation and planning phase mainly to do with a lack of clear definitions of the scope of the project leading to changes on the part of the contractor in the execution phase, will also result in cost overruns.

2.4.3 MATERIAL – RELATED CONSTRAINTS

The rundown of material related problems which lead to cost overruns in

construction project shows that increase in the cost of materials during the construction stage after the initial contract sum was established due to inflation or fluctuation, inaccurate material estimating and shortage of resources all lend a hand to overruns. Substitution of materials or procedures, materials purchased at a higher and waste of construction materials are all factors to contend with. Though some of these wastages that can lead to additional cost are sometimes unavoidable especially during utilization; such as residual, application and cutting waste, however during the process of procuring, transportation and storage of the materials, the waste factor comes into play. These include purchasing materials of wrong specification only to be returned. Buying excess quantity (more than required), damages arising from deterioration and breakages such as the exposure of cement and paint to inclement weather and air, breakages of aluminium glasses and the loss of construction materials to fire and theft (Salama et al. 2007).

2.4.4 CLIENT – RELATED PROBLEMS

The client's intervention is one of the major factors that lead to cost overrun. Mostly, the client's market driven attitude such as their lack of knowledge and experience in procuring materials pushes them to expedite project phases either by using a fast track approach or by squeezing the cost allocated for the initiation, planning and execution phase without regard to the importance of each project phase is always a

cause for concern. A major factor during the execution phase is the intervention of the client to change the scope, hence altering the project cost.

Clients insisting on playing a leading role in the approval of design, subcontractor selection, materials and design changes, budget constraint, the client seeking to save some money despite hiring the services of a qualified project manager thus causing series of re-work and in many cases influences the quality of materials purchased and execution of the project all constitute the client related constraints. Professional construction project practitioners in Dubai, for instance reported a considerable number of cases whereby a client requests additional floors to a building after the construction had started along with a review of the entire design to add more flats to each floors in order to increase profit. No doubt, the project cost will be affected (Salama et al. 2007).

2.4.5 SUGGESTED WAYS OF IMPROVING COST PERFORMANCE

The most effective suggestions was a matured and well developed relationship between the contractor, consultant and the client coupled with honesty, clarity of the scope of work, review of the changes in design for feasibility purposes, work breakdown schedule (WBS) and freezing of the design (continuous modification of the design as construction work is underway).

Adequate time is also suggested to be spent on the design stage so that the client can change what he wants and accurate information must be disseminated between parties to the contract. Admittedly, clients have the right to initiate changes, the reason being that the project belongs to them. However, this can only be done if they are contractually permissible and are prepared to pay the associated cost (Salama et al. 2007).

2.5 QUALITY PERFORMANCE

According to Al-momani (2007), quality is another basic criterion that is heavily referred to by previous researchers as a framework for measuring the performance of a project. Quality is of major concern for all sectors of the economy, including construction. The primary aim of a quality system is to prevent non-conformity at all stages of a project and as a result, the control of non-conformances, waste and quality loss reduction should become a focal point in any organization's quality improvement efforts. Non-conformities can include any kind of deviation from the 'specified requirements' and may be in the form of failure, waste, defect, error and any other loss that might prevent a product or service from meeting its 'fitness for purpose or use' and customer satisfaction (Ankrah et al. 2005).

The construction sector faces serious performance problems such as numerous design changes, escalating cost, and shortage of materials, improper planning, increased quantities, payment delays, poor contract management and inadequate contractor experience. In this context, poor construction quality damages the performance of a project. In the light of the difficulties facing construction contractors in their quest for quality performance, they have encountered much pressure to improve quality. Among these are the rising standard of living increasing consumerism and choices, change in the client's expectation and deficiencies in the quality of work.

Different measurement methods have been used to measure quality performance. The performance of building elements, the owner's satisfaction and administrative burden are among this. Al-momani (2007) opined that technical specification are provided to ensure that buildings are built to good standard and by proper procedure and it can be used to ascertain if the instructions or guidelines given to contractors by the client at the commencement of a project are achieved or met. Target attainment, technical specification and quality, and the overall client's target and satisfaction are thus the basis for quality measurement. Suffice; it has not always been easy to achieve total quality performance due to the fact that the assessment of quality is a rather subjective issue

(influenced by personal feelings and therefore perhaps unfair).

2.5.1 CAUSES OF SUB-STANDARD QUALITY OF WORK

Several factors are responsible for sub-standard quality of work experienced in construction projects. These include;

- Non-compliance or non-conformity to the project specification.
- Frequent re-work leading to the absence of quality materials essential for quality performance.
- Clients becoming developers, contractors and project managers, procuring low quality materials and ordering unnecessary changes to the design due to their specific needs.
- No proper supervision of works by site supervisors, inadequate labour skills and machinery along with in the experience of the contractor.
- The client's financial constraint resulting in the procurement of damaged or defective materials for the construction work in order to cut cost (cost savings).
- Changing the project specification requirements after much of the basic planning was carried out and insufficient time being given to the consultant to design and for the contractor to construct or erect structure.

2.5.2 SUGGESTED WAYS OF IMPROVING QUALITY PERFORMANCE

Relevant literature emphasizes the importance of the planning and execution phases where proactive measures must be taken to ascertain the client's needs and requirements, in order that the project specification can be strictly adhered to in the later stages of the construction project to enhance quality performance. Seriousness is also required on the part of the contractor and site supervisors along with the avoidance of the client dominating the market and procuring construction materials. Broetzmann et al. (1995) cited in Al-momani (2007), opined that the adoption of Total Quality Management will bring improvements to organizational performance. Continuous improvement, higher customer satisfaction, better quality products and a higher market share are obtained if construction companies adopt TQM in their operation.

2.6 THE TRIANGLE OF TIME, COST AND QUALITY

Construction projects are complex in nature. This complexity arises from the need to comply with numerous regulations, involve professional consultants, achieve value for money, demonstrate accountability, regulate complicated contractual relationships and through all this; achieve a timescale largely dictated by the client's specific business objectives. Nevertheless, irrespective of however complicated modern construction may be, they are all based on the comparatively simple

principles of Cost, Quality and Time.

According to Hackett et al. (2005), from a client's perspective the cost, quality and time paradigm might be considered as being the lowest cost, at the highest quality and in the shortest time. On the other hand, Ikpo (2000) opined that from a contractor's point of view, the same paradigm might be considered as being within the cost limit (cost minimization), at the stated quality and also within the time schedule. Unfortunately this has not always been possible due to the fact difficulties often arise while trying to balance the cost, quality and time all together and a compromise has to be sought based on the client's priorities which is of paramount importance. These criteria and the compromise can be visualized as a triangle as shown below;

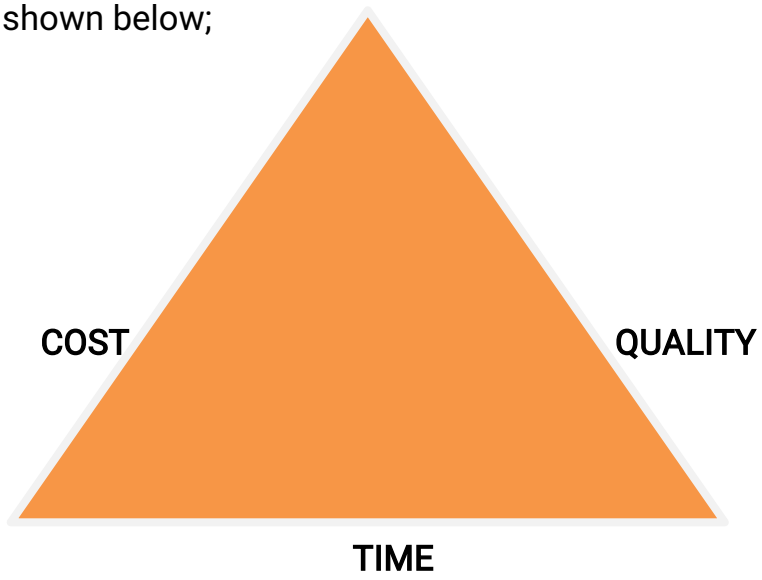


Figure 2.4; The Eternal Triangle

Source; Hackett, Robinson and Statham (2005)

Hackett et al. (2005) opines that if these three factors are kept in balance; with appropriate quality being achieved at an acceptable price in a reasonable timescale, the triangle would appear equilateral – with equal weight or emphasis being given to each other as shown above. But if however, particular circumstances dictate that one of the factors must take precedence, the other two will no doubt have to 'suffer' or carry less weight/emphasis. The decision must lie with the client.

- If quality is of paramount importance, adequate time must be allowed for the design and specification to be perfected and cost may rise on both counts as pictured below;

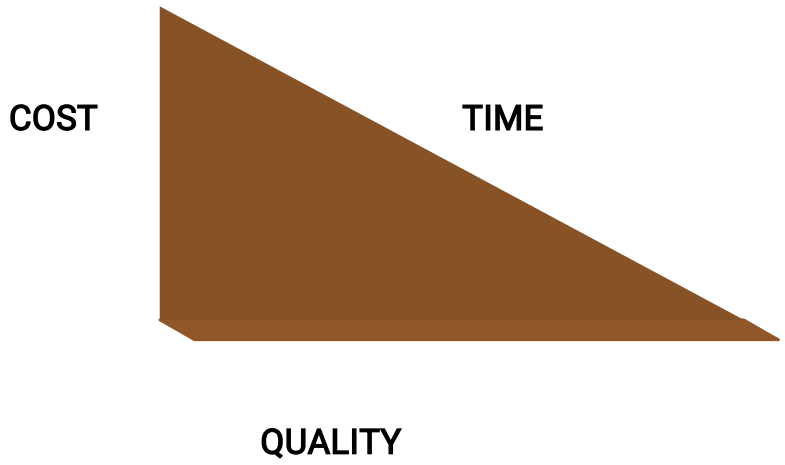


Figure 2.5; Variation on the Triangle showing Quality priority

Source; Hackett, Robinson and Statham (2005)

- If speed of timely completion is paramount, quality and cost may both have to suffer as pictured below;

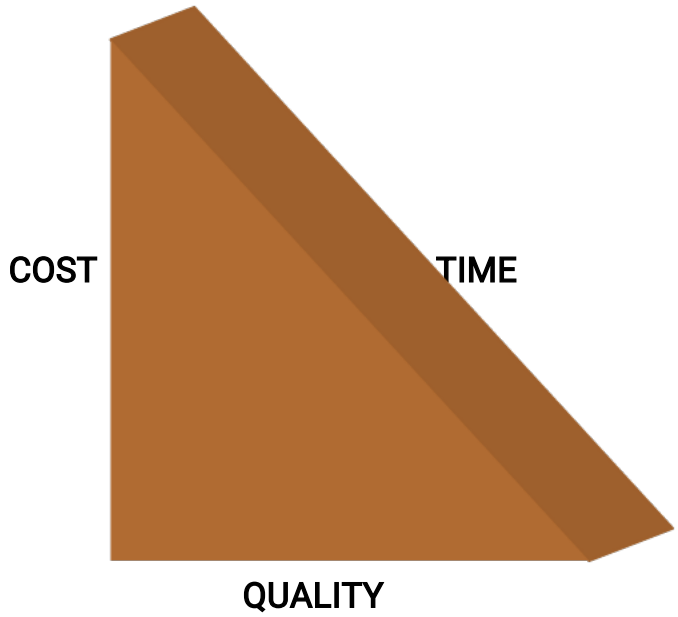


Figure 2.6; Variation on the Triangle showing Time priority

Source; Hackett, Robinson and Statham (2005)

- If lowest cost is the priority, time may not be prejudiced but quality could suffer as the pictorial representation below shows;

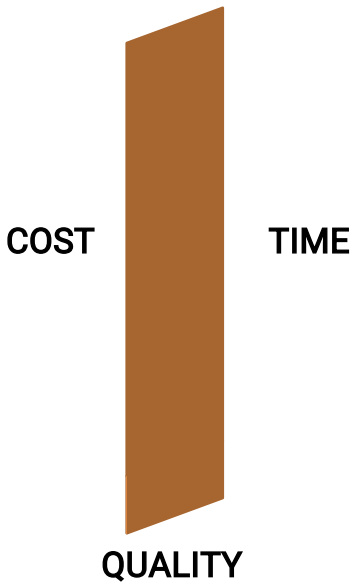


Figure 2.7; Variation on the Triangle showing Cost priority

Source; Hackett, Robinson and Statham (2005)

The effect of all these different priorities is relative and there's no reason why with proper planning and management those elements with a lower priority cannot be adequately controlled (Hackett et al. 2005).

CHAPTER THREE

3.0 RESEARCH METHODOLOGY

3.1 INTRODUCTION

This chapter focuses on the procedures adopted in the collection of data for the work in order to achieve the stated research objectives.

3.2 AREA OF THE STUDY

The study is conducted in Uyo and Okobo local government area of Akwa Ibom State. Uyo is the capital city of the state. There are lots of Building and Civil Engineering construction activities going on such as the E-Library and the Roundabout/Flyover project at Itam, while Okobo, located 30kilometers from the state capital where the construction of the Akwa Ibom International Airport (AKIA) is currently in progress are two of the local government areas which the study will both be centred on.

3.3 RESEARCH DESIGN

This research work is designed to use the survey method in which the opinion of construction professionals was sought on the factors affecting the performance of construction project. The cross-sectional approach that elicits the opinion of contracting firms and professionals through a well-structured questionnaire on the issues of project performance was adopted for this study.

3.4 POPULATION OF THE STUDY

The study is essentially carried out with a focus on Building and Civil Engineering projects. The population thus comprises of contractors, consultants and clients currently engaged in project execution in Akwa Ibom State.

3.5 SAMPLE SIZE AND SAMPLING TECHNIQUE

The stratified random sampling technique was used for the study. A total of seventy (70) sample size was selected representing 30 Contractors, 25 Consultants and 15 Clients.

3.6 METHOD OF DATA COLLECTION

The data for this research work was obtained from both the primary and secondary sources. The primary source consisted of a well-structured questionnaire administered on the respondents while the secondary source was made up of published articles and relevant literature materials related to the research topic.

The questionnaire was divided into two sections; while the first section focused on a brief profile of the respondent, the second section sought to obtain the opinion of the respondents on the issue of the performance of construction projects.

3.7 METHOD OF DATA ANALYSIS

The data obtained from the properly completed and returned questionnaires were presented in a tabular form in chapter four. Data were analysed using index and percentages.

- **INDEX**

This method involves assigning numerical values using the Likert five point ranking factor to the respondent's rating of factors affecting construction project performance. This was calculated using the fomula;

$$\text{Index} = \sum a\,(n/N) \times \frac{100}{5}$$

Where ; a = Weighting given to the response (1 – 5)

n = Frequency of response under each weighting

N = Total Number of response

CHAPTER FOUR

4.0 DATA PRESENTATION AND ANALYSIS

4.1 INTRODUCTION

A total of seventy (70) questionnaires were administered within the study area to proffer solutions to the research questions. 53 questionnaires were collected from the respondents, 5 were discovered to contain errors and inconsistencies and were rejected. 48 duly completed questionnaires were therefore used for the analysis representing a 68.57% response rate.

TABLE 4.1: *Rate of response to the questionnaire*

RESPONSES	NUMBER	PERCENTAGE
Questionnaire duly completed	48	68.6
Questionnaire not duly completed	5	7.1
Questionnaire not received	17	24.3
TOTAL	**70**	**100**

4.2 FEATURES AND DISTRIBUTION OF RESPONDENTS

TABLE 4.2: *Designation of the respondents*

DESIGNATION	NO. OF RESPONDENTS	PERCENTAGE
CLIENTS	11	22.9
CONTRACTORS	23	47.9
CONSULTANTS	14	29.2
TOTAL	**48**	**100**

Based on the analysis shown in Table 4.2, 11 Clients representing 22.9% responded while 23 Contractors representing 47.9% responded and 14 Consultants representing 29.2% also responded.

TABLE 4.3; *Years of experience of the respondent*

YEARS	FREQUENCY	PERCENTAGE
1 – 5	9	18.8
6 – 10	16	33.3
11 – 15	13	27.1
16 – 20	6	12.5
20 and Above	4	8.3
TOTAL	**48**	**100**

TABLE 4.3 shows the years of experience of the respondents. About, 81%

of the respondents have over 5years working experience in the construction industry indicating that the information provided by the respondent can be relied on for analysis purposes.

4.3 DISTRIBUTION OF QUESTIONNAIRES AND RESPONSES

TABLE 4.4: *Major criteria for measuring project performance*

CRITERIA	YES	NO	TOTAL
Are time, cost and quality the major criteria used in measuring the performance of a construction project?	34	14	48

In Table 4.4 above, the analysis reveals that 34 respondents agreed that tme, cost and quality are the three major criteria used in measuring the performance of a construction project, while 14 respondents however did not agree.

TABLE 4.5: *Factors that affect Time Performance on projects*

THE FACTORS		SCORES					INDEXS CORE	RANK
		1	2	3	4	5		
A	Inadequate budget and financial problems	0	6	7	15	20	80.4	1st
B	Project complexities and buildabilty	0	7	9	18	14	76.3	2nd

	problems							

C	Unecessary changes in the design	0	7	8	15	18	44.4	5th
D	Inclement weather condition	0	8	6	25	9	74.5	3rd
E	Design problems during construction period	0	8	15	14	11	71.8	4th

Index Formula; = ∑ a (n/N) × 100/5

Table 4.5 shows the ranking order of the factors affecting time performance of projects in the construction industry in Akwa Ibom State. The result reveals that inadequate budget and financial problems is the major factor that affects the performance of time in construction projects. It is closely followed by project complexities and buildability problems. Other factors in their order of ranking are inclement weather conditions, design problems during the construction period and unnecessary changes in the design.

Other factors that affects time performance that was suggested by the respondents included; community problems, managerial effectiveness,

death of one of the parties, lack of ingenuity on the part of builders, staff welfare and the topography of the site, experience, equipment and labour force.

TABLE 4.6: ***Factors that affect Cost Performance on projects***

	THE FACTORS	SCORES					INDEX SCORE	RANK
		1	2	3	4	5		
A	Variations and additional works	1	6	7	21	13	76.2	2nd
B	Wastage and theft of construction materials	2	7	8	17	14	74.0	3rd
C	Inaccurate material estimating	0	7	18	10	13	71.9	4th
D	Unnecessary claims	3	9	11	15	10	68.3	5th
E	Increase in the cost of materials	0	7	5	13	23	81.4	1st

Index Formula = ∑ a (n/N) × 100/5

Table 4.6 shows the ranking order of the factors that affects the performance of cost in construction work. The result indicates that increase in the cost of materials is the major factor that affects cost performance followed by variations and additional works. Others are; wastage of and theft of construction materials, inaccurate material estimating and unnecessary claims which is ranked as the last.

Other factors affecting the performance of cost as indicated by respondents include; fluctuation in labour and equipment, lack of focus, quality of the materials used, availability of the materials and accessibility of the site.

TABLE 4.7: *Factors that affect Quality Performance on construction projects*

THE FACTORS		SCORES					INDEX SCORE	RANK
		1	2	3	4	5		
A	Procurement of low quality materials	0	0	11	12	25	85.8	1st
B	Frequent re-work	2	7	9	23	7	70.8	5th
C	Non-compliance to the project specification	0	7	5	11	25	82.4	2nd
D	Improper planning and supervision	2	6	7	20	13	75	4th
E	Financial constraints	0	8	10	10	20	77.4	3rd

Index Formula = ∑ a (n/N) × 100/5

The result in Table 4.7 above shows that procurement of low quality materials is the major factor that affects the performance of quality in construction projects. This is closely followed by non-compliance to the project specification. Other factors in their order of ranking includes; financial constraints, improper planning and supervision and frequent re-

work.

Respondents also indicated that the client's intervention, timeline of the construction, inexperience and death of the original builder or developer all affects the performance of quality.

TABLE 4.8: *Effects of poor performances on construction projects*

THE EFFECTS		SCORES					INDEX SCORE	RANK
		1	2	3	4	5		
A	Abandoning of projects	1	7	8	11	21	78.2	1st
B	Conflicts and disputes among parties to the contract	2	7	7	19	13	77	2nd
C	Professional reputation of the construction team adversely affected	1	6	8	21	12	75.2	3rd
D	Degradation of quality standard	2	7	8	13	8	67.3	6th
E	Non-timely completion	3	9	18	20	9	69.6	5th
F	Escalation of project cost	2	7	7	19	12	73	4th

Index Formula = $\sum a\,(n/N) \times 100/5$

The result presented in Table 4.8 indicates that abandoning of projects is the most severe effect of poor performance on construction projects, closely followed by conflicts and disputes among parties to the contract. Others include; professional reputation of the construction team adversely affected, escalation of project cost, non-timely completion and degradation of quality standard. Respondents also attributed the collapse of buildings and blacklisting of contracting firms as other effects that poor performance can cause on construction projects.

The survey has also revealed some measures to be adopted so as to increase the performance of building and civil engineering construction projects. Adequate communication between clients, contractors and consultants was indicated as the major factor to be adopted followed by the selection of competent professionals to handle construction projects. Others include; provision of adequate funds for projects, setting performance targets, effective labour productivity, provision of insurance and incentive schemes for the workers and lastly reviewing design changes for feasibility purposes.

Respondents also suggested that the adoption of an effective leadership style, elimination of politics in construction projects, honesty and diligence to work and the quality of materials used will all increase the

performance of Building and Civil Engineering projects.

4.4 DISCUSSION OF RESULTS

The discussion is done under the three major criteria of project performances which are; Time, Cost and Quality.

Time

The analysis of data has revealed the rating of the factors associated with poor time performance of construction projects as shown in Table 5. Based on the factors which included; inadequate budget and financial problems, project complexities and buildabilty problems, unnecessary changes in the design, inclement weather conditions and design probems during the construction period. Respondents affirmed that these factors will all affect the performance of time, but rated inadequate budget and financial problems as the main factor that affects time performance as reflected in the result of the index score which was 80.4.

This agrees with the findings of Mbachu (2007) who attributed cash flow problems and insufficient funding to ensure progress and timely completion as the most influential constraint to time performance. Mbachu (2007), also observed that frequent changes to the scope of work especially at critical stages of the implementation process, project complexities and buildability problems (design not compatible with the

contractor's method and equipment) and inclement weather conditions all affects time performance.

The findings of this study is also corroborated by evidence in Mantel et al. (2001) cited Mbachu (2007), who listed possible construction project delays which affects time performance to include improper or inadequate planning, late deliveries of material by sub-contractors, bad weather, unreasonable deadlines, equipment failure and complex coordination problems.

Cost

Table 6 dealt with the factors that affect the performance of cost in construction projects and the result shows that increase in the cost of materials was ranked as the major factor with an index score of 81.4%. The result agrees with the findings of Salama et al. (2007), that increase in the cost of materials during the construction stage after the initial contract sum was established due to inflation or fluctuation, inaccurate material estimating, wastage of construction materials all lend a hand to cost overruns which in turn affects cost performance.

The findings of this study also agrees with the observations of Chan (2001) and Salama et al. (2007), who both indicated that frequent or

unnecessary claims, availability of materials, price inflation during the construction and variations all accounts for the poor performance of construction projects.

Quality

The result in Table 7 shows the respondents agreed that the procurement of low quality materials highly affects quality performance as it was rated as the major factor. There is an agreement of relevant literature to this finding with Ankrah et al. (2005) and Al-momani (2007) noting that procuring low quality materials definitely affects the performance of quality in construction projects.

The findings of this study is also consistent with the observations of Al-momani (2007), that the client's financial constraint resulting in the procurement of damaged or defective materials for the construction work in order to cut or save cost and non-compliance or non-conformity to the project specifications, which are provided to ensure that buildings are erected to good standards and by proper procedures are all constraints to quality performance.

Respondents made further suggestions on the factors affecting quality performance to include the client's intervention, timeline of the

construction, improper coordination and inexperience of the contractor. This lends credence to the findings of Salama et al. (2007) and Al-momani (2007), that the prevalent intervention of the client in the decision making process throughout the project's life cycle coupled with a tendency to expedite projects, complex coordination processes and the non-inclusion of experienced professional contractors, sub-contractors and consultants to execute project are all constraint to effective quality performance in construction projects.

CHAPTER FIVE

5.0 SUMMARY, CONCLUSION AND RECOMMENDATION

5.1 INTRODUCTION

This chapter presents the summary of the findings, recommendations and conclusion of the study.

5.2 SUMMARY OF FINDINGS

The finding from the analysis have revealed numerous factors hindering the performance of time, cost and quality in construction projects which have resulted in the poor performances of construction work. The result shows that inadequate budget and financial problems is the major factor that affects the performance of time in construction projects. It was also suggested that community problems, staff welfare and death of one of the parties to a contract also affects time performance.

On the aspect of cost performance, the result showed that increase in the cost of materials was identified as the major factor hindering the performance of cost in construction project. It is also evident from the result that the procurement of low quality materials is the main factor that affects quality performance, while the client's intervention, inexperience and the timeline of the construction work were also indicated as other factors hindering quality performance.

The study has also identified the main effect of poor performance on construction project to be project abandonment, while others include collapse of buildings and blacklisting of contracting firms. On the major criteria used in measuring the performance of a construction project; time, cost and quality were agreed as the three major criteria used in measuring project performance, while the satisfaction of all the participants including the client, the design and construction team; environmental performance, functionality and health and safety etc were subjective measures (soft measures) that were suggested as other performance criterias.

The study has also pinpointed some measures to be adopted so as to increase the performance of construction projects in Akwa Ibom State. Adequate communication between clients, contractors and consultants was indicated as the major factor to be adopted. Selecting competent professionals to handle construction projects, setting performance targets, provision of adequate funds for projects, elimination of politics in construction projects and effective leadership style were measures also indicated that if adopted will definitely improve and increase the performance of construction projects.

5.3 PROBLEMS ENCOUNTERED IN THE RESEARCH

The following problems were encountered during the course of this research work.

- Time/cash constraints; Absence of sufficient time and fund.
- Less cooperation by some of the respondents in filling the questionnaires resulting in a relatively fair response rate.

5.4 RECOMMENDATIONS

On the basis of the findings in this research, the following recommendations are made;

- Construction clients should ensure that adequate funds are made available to execute a project and contractors should display honesty when handling funds meant for construction work.
- Contracting and consultancy firms should always ensure that adequate provisions are made to take care of fluctuations and a reasonable contingency sum should be inserted in the contract bills as these will handle the issue of increase in the cost of building materials during the construction phase.
- At the initial or planning stage of a project, sufficient standard quality of building materials should be procured so that during the execution stage, high quality of work can be achieved using the specified materials.

- Construction clients, contractors, consultants, site supervisors and labourers should ensure effective planning, supervision and execution along with seriousness to work should be strictly adhered to, so that the rate of project abandonment and collapse of buildings can be reduced in construction projects.

5.5 AREAS FOR FURTHER RESEARCH

Time, cost and quality have been established as the three basic and the most important performance indicators in construction projects. However, suggestions made by respondents and observations by researchers reveals that subjective measures such as the satisfaction of all the participants of a construction project including the design and construction team, health and safety, environmental performance functionality, value and profit etc exist and can also be used in measuring the performance of a construction project. This calls for further investigation.

5.6 CONCLUSION

The factors affecting the performance of construction project has been the main the focus of this research work. The investigation has provided meaningful insight into factors hindering the three major criteria used in measuring project performance which have been identified to be time, cost and quality as well as the consequences that poor performance have on construction projects.

The result indicates that although five factors that affects the performance of time which included; inadequate budget and financial problems, project complexities and buildability problems, inclement weather conditions, design problems during the construction period and unnecessary changes in the design were all agreed, inadequate budget and financial problems was identified as the major factor that affects time performance. Increase in the cost of materials and the procurement of low quality materials were also indicated as major factors that affects the performance of cost and quality respectively.

The result of this study has also traced the effects of poor performance on project currently being experienced to include abandoning of projects, conflicts and disputes among parties to the contract, time and cost overruns, degradation of quality standards, collapse of buildings, blacklisting of contracting firms. These are capable of reducing the efficiency of the construction industry.

The study draws attention to the need for adequate communication between clients, contractors and consultants and the handling of construction projects by experienced professionals in the industry. In the light of these, it is hoped that the results in this study will provide useful guides to clients, contractors and consultants in assessing, planning,

executing and improving both in the organization and industry level as well as reducing the rate of poor performances in construction projects and optimizing the overall performance in future construction projects.

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APPENDIX I

Department of Quantity Surveying

Faculty of Environmental Studies

University of Uyo

Akwa Ibom State.

QUESTIONNAIRE

Dear Respondent,

I am currently conducting a research on “THE FACTORS AFFECTING THE PERFORMANCES OF CONSTRUCTION PROJECTS” as part of the requirement for my degree programme.

This exercise is purely academic and the required information is strictly for academic purpose only. Be assured that your prompt and honest answer to the questions is appreciated and your confidentiality is guaranteed.

Thanks for your understanding and assistance.

ISANG, INIMBOM WALTER

Researcher

SECTION A

RESPONDENT'S PROFILE

1. Name of the Company or Government Dept.....

2. Location.....

3. Designation of the Respondent (Please tick your area as indicated)

 a) CLIENT

 b) CONTRACTOR ☐

 C) CONSULTANT ☐

 ☐

4. Years of Experience of respondent in the Construction Industry

 a) 1 – 5years ☐ (b) 6 – 10years ☐ (c) 11 – 15years ☐

 d) 16 – 20years ☐ (e) 20years and above ☐

SECTION B

Guidelines: Kindly tick the box most appropriate to you and comment where you think it is necessary.

1. In your opinion, do you agree that time, cost and quality are the major

criterias used in measuring the performance of a construction project?

YES ☐ NO ☐

If NO, please specify others.....

Guidelines: Kindly rank the level of Importance in the box using a scale of 1 – 5, where 5 = Very Important, 4 = Important, 3 = Averagely Important, 2 = Less Important and 1 = Not Important.

2. The following are the factors that affect the performance of Time in Building and Civil Engineering Projects?

TIME PERFORMANCE		Very Important (5)	Important (4)	Averagely Important (3)	Less Important (2)	Not Important (1)
A	Inadequate budget and financial problems					
B	Project complexities and buildability problems					

C	Unnecessary changes to the design					
D	Inclement weather conditions					
E	Design problems during construction period					
F	Others; (Specify & rank)					

3. The following are the factors that affect the performance of Cost in Construction Work?

COST PERFORMANCE		Very Important (5)	Important (4)	Averagely Important (3)	Less Important (2)	Not Important (1)
A	Variations and additional works					
B	Wastage and theft of construction materials					
C	Inaccurate material estimating					

D	Unneccessary claims					
E	Increase in the cost of materials					
F	Others; (Specify & rank)					

4. The following are the factors that affect the performance of Quality in Construction Project?

QUALITY PERFORMANCE		Very Important (5)	Important (4)	Averagely Important (3)	Less Important (2)	Not Important (1)
A	Procurement of low quality materials					
B	Frequent re-work					
C	Non-compliance to the project specification					
D	Improper planning and supervision					
E	Financial constraint					
F	Others; (Specify & rank)					

Guidelines; Kindly rank the level of severity in the box using a scale of 1 – 5, where 5 = Extremely severe, 4 = Very severe, 3 = Averagely severe, 2 = Less severe and 1 = Not severe.

5. The following are the effects of poor performances on construction projects.

	EFFECTS ON PROJECTS	Extremely severe **(5)**	Very severe **(4)**	Averagely severe **(3)**	Less severe **(2)**	Not severe **(1)**
A	Abandoning of projects					
B	Conflicts and disputes among parties to the contract					
C	Professional reputation of the construction team adversely affected					
D	Degradation of quality standard					
E	Non-timely completion					
F	Escalation of project cost					
G	Others; (Specify & rank)					

Guidelines; Kindly rank the level of Importance in the box using a scale of 1 – 5, where 5 = Very Important, 4 = Important, 3 = Averagely Important, 2 = Less Important and 1 = Not Important.

6. In your opinion, what should be adopted to increase the performance of Building and Civil Engineering Projects?

a) Adequate communication between clients, contractors and consultants ☐

b) Selection of competent professionals to handle construction projects ☐

c) Provision insurance and incentive schemes for the workers ☐

d) Reviewing of design changes for feasibility purposes ☐

e) Provision of adequate funds for project ☐

f) Effective labour productivity ☐

g) Setting performance targets ☐

h) Others; (Specify & rank)..... ☐

APPENDIX II – STATISTICAL ANALYSIS TABLES

Factors affecting the performance of Time

THE FACTORS		Very Important (5)	Important (4)	Averagely Important (3)	Less Important (2)	Not Important (1)
A	Inadequate budget and financial problems	5(20÷48) ×100÷5 = 41.6	4(15÷48) × 100÷5 = 25	3(7÷48) × 100÷5 = 8.8	2(6÷48) × 100÷5 = 5	1(0÷48) × 100÷5 = 0
B	Project complexities and buildability problems	5(14÷48) × 100÷5 = 29.2	4(18÷48) × 100÷5 = 30	3(9÷48) × 100÷5 = 11.3	2(7÷48) × 100÷5 = 5.8	1(0÷48) × 100÷5 = 0
C	Unnecessary changes to the design	5(18÷48) × 100÷5 = 3.75	4(15÷48) × 100÷5 = 25	3(8÷48) × 100÷5 = 9.8	2(7÷48) × 100÷5 = 5.8	1(0÷48) × 100÷5 = 0
D	Inclement weather conditions	5(9÷48) × 100÷5 = 18.8	4(25÷48) × 100÷5 = 41.6	3(6÷48) × 100÷5 = 7.5	2(8÷48) × 100÷5 = 6.6	1(0÷48) × 100÷5 = 0
E	Design problems during construction period	5(11÷48) × 100÷5 = 23	4(14÷48) × 100÷5 = 23.4	3(15÷48) × 100÷5 = 18.8	2(8÷48) × 100÷5 = 6.6	1(0÷48) × 100÷5 = 0
F	Others; (Specify & rank)					

Summation of the factors affecting Time Performance

Factor A; ∑ = 80.4 (1st) Major Factor

Factor B; ∑ = 76.3 (2nd)

Factor C; ∑ = 44.4 (3rd)

Factor D; ∑ = 74.5 (4th)

Factor C; ∑ = 71.8 (5th)

Factors affecting the performance of Quality

THE FACTORS		Very Important (5)	Important (4)	Averagely Important (3)	Less Important (2)	Not Important (1)
A	Variations and additional works	5(13÷48) × 100÷5 = 27	4(21÷) × 100÷5 = 35	3(7÷48) × 100÷5 = 8.8	2(6÷48) × 100÷5 = 5	1(1÷48) × 100÷5 = 0.4
B	Wastage and theft of construction materials	5(14÷48) × 100÷5 = 29.2	4(17÷48) × 100÷5 = 28.4	3(8÷48) × 100÷5 = 9.8	2(7÷48) × 100÷5 = 5.8	1(2÷48) × 100÷5 = 0.8
C	Inaccurate material estimating	5(13÷48) × 100÷5 = 27	4(10÷48) × 100÷5 = 16.6	3(18÷48) × 100÷5 = 22.5	2(7÷48) × 100÷5 = 5.8	1(0÷48) × 100÷5 = 0
D	Unnecessary claims	5(10÷48) × 100÷5 = 20.8	4(15÷48) × 100÷5 = 25	3(11÷48) × 100÷5 = 13.8	2(9÷48) × 100÷5 = 7.5	1(3÷48) × 100÷5 = 1.2
E	Increase in the	5(23÷48)	4(13÷48)	3(5÷48) ×	2(7÷48) ×	1(0÷48) ×

	cost of materials	× 100÷5 = 47.8	× 100÷5 = 21.6	100÷5 = 6.2	100÷5 = 5.8	100÷5 = 0
F	Others; (Specify & rank)					

Summation of the factors affecting Cost Performance

Factor A; ∑ = 76.2 (2^{nd})

Factor B; ∑ = 74 (3^{rd})

Factor C; ∑ = 71.9 (4^{th})

Factor D; ∑ = 68.3 (5^{th})

Factor E; ∑ = 81.4 (1^{st}) Major Factor

Factors affecting the performance of Quality

THE FACTORS		Very Important **(5)**	Important **(4)**	Averagely Important **(3)**	Less Important **(2)**	Not Important **(1)**
A	Procurement of low quality materials	5(25÷48) × 100÷5 = 52	4(12÷48) × 100÷5 = 20	3(11÷48) × 100÷5 = 13.8	2(0÷48) × 100÷5 = 0	1(0÷48) × 100÷5 = 0
B	Frequent re-work	5(7÷48) × 100÷5 = 14.6	4(23÷48) × 100÷5	3(9÷48) × 100÷5 = 11.2	2(7÷48) × 100÷5 = 5.8	1(2÷48) × 100÷5 = 0.8
C	Non-compliance to the project specification	5(25÷48) × 100÷5 = 52	4(11÷48) × 100÷5 = 18.4	3(5÷48) × 100÷5 = 6.2	2(7÷48) × 100÷5	1(0÷48) × 100÷5 = 0

D	Improper planning and supervision	5(13÷48) × 100÷5 = 27	4(20÷)×÷	3(7÷)×÷	2(6÷)×÷	1(2÷)×÷
E	Financial constraint	5(20÷48) × 100÷5 = 41.6	4(10÷48) × 100÷5 = 16.6	3(10÷48) × 100÷5 = 12.6	2(8÷48) × 100÷5 = 6.6	1(0÷48) × 100÷5 = 0
F	Others; (Specify & rank)					

Summation of the factors affecting Quality Performance

Factor A; ∑ = 85.8 (1st) Major Factor

Factor B; ∑ = 70.8 (5th)

Factor C; ∑= 82.4 (2nd)

Factor D; ∑ = 75 (4th)

Factor E; ∑ = 77.4 (3rd)

Effects of poor performances on construction projects

THE EFFECTS		Extremely severe **(5)**	Very severe **(4)**	Averagely severe **(3)**	Less severe **(2)**	Not severe **(1)**
A	Abandoning of projects	5(21÷48) × 100÷5 = 43.8	4(11÷48) × 100÷5 = 18.4	3(8÷48) × 100÷5 = 9.8	2(7÷48) × 100÷5	1(1÷48) × 100÷5 = 0.4
B	Conflicts and disputes among parties to the contract	5(13÷48) × 100÷5 = 27	4(19÷48) × 100÷5 = 31.6	3(7÷48) × 100÷5 = 8.8	2(7÷48) × 100÷5 = 8.8	1(2÷48) × 100÷5 = 0.8

C	Professional reputation of the construction team adversely affected	5(12÷48) × 100÷5 = 25	4(21÷48) × 100÷5 = 35	3(8÷48) × 100÷5 = 9.8	2(6÷48) × 100÷5 = 5	1(1÷48) × 100÷5 = 0.4
D	Degradation of quality standard	5(8÷48) × 100÷5 = 16.6	4(13÷48) × 100÷5 = 21.6	3(18÷48) × 100÷5 = 22.5	2(7÷48) × 100÷5 = 5.8	1(2÷48) × 100÷5 = 0.8
E	Non-timely completion	5(9÷48) × 100÷5 = 18.8	4(20÷48) × 100÷5 = 33.3	3(7÷48) × 100÷5 = 8.8	2(9÷48) × 100÷5 = 7.5	1(3÷48) × 100÷5 = 1.2
F	Escalation of project cost	5(12÷48) × 100÷5 = 25	4(19÷48) × 100÷5 = 31.6	3(8÷48) × 100÷5 = 9.8	2(7÷48) × 100÷5 = 5.8	1(2÷48) × 100÷5 = 0.8
G	Others; (Specify & rank)					

Summation of the Effects of Poor Performances on Construction Projects

Factor A; ∑ = 78.2 (1st) Major Effect

Factor B; ∑ = 77 (2nd)

Factor C; ∑ = 75.2 (3rd)

Factor D; ∑ = 67.3 (6th)

Factor E; ∑ = 69.6 (5th)

Factor F; ∑ = 73 (4th)

Measures to be adopted to increase the performance of building and civil engineering projects

THE MEASURES		Very Important (5)	Important (4)	Averagely Important (3)	Less Important (2)	Not Important (1)
A	Adequate communication between clients, contractors and consultants	5(28÷48) × 100÷5 = 58.4	4(14÷48) × 100÷5 = 23.3	3(6÷48) × 100÷5 = 7.5	2(0÷48) × 100÷5 = 0	1(0÷48) × 100÷5 = 0
B	Selection of competent professionals to handle construction projects	5(16÷48) × 100÷5 = 33.3	4(20÷48) × 100÷5 = 33.4	3(5÷48) × 100÷5 = 6.2	2(8÷48) × 100÷5 = 6.7	1(0÷48) × 100÷5 = 0
C	Provision of insurance and incentive schemes for the workers	5(18÷48) × 100÷5 = 37.5	4(9÷48) × 100÷5 = 15	3(13÷48) × 100÷5 = 16.2	2(1÷48) × 100÷5 = 0.8	1(7÷48) × 100÷5 = 3
D	Reviewing of design changes for feasibility purposes	5(8÷48) × 100÷5 = 16.6	4(15÷48) × 100÷5 = 25	3(17÷48) × 100÷5 = 21.2	2(4÷48) × 100÷5 = 3.33	1(4÷48) × 100÷5 = 1.6
E	Provision of adequate funds for projects	5(19÷48) × 100÷5 = 39.6	4(15÷48) × 100÷5 = 25	3(7÷48) × 100÷5 = 8.8	2(6÷48) × 100÷5 = 5	1(1÷48) × 100÷5 = 0.4
F	Effective labour	5(18÷48)	4(15÷48)	3(6÷48) ×	2(7÷48) ×	1(2÷48) ×

	productivity	× 100÷5 = 37.5	× 100÷5 = 25	100÷5 = 7.5	100÷5 = 5.8	100÷5 = 0.8
G	Setting performance targets	5(24÷48) × 100÷5 = 50	4(11÷48) × 100÷5 = 18.4	3(3÷48) × 100÷5 = 3.8	2(3÷48) × 100÷5	1(7÷48) × 100÷5 = 3
H	Others; (Specify & rank)					

Summation of the measures to be adopted to increase the performance of building and civil engineering construction projects.

Measure A; ∑ = 89.2 (1st) Major Measure

Measure B; ∑ = 79.6 (2nd)

Measure C ∑ = 72.5 (6th)

Measure D ∑ = 67.8 (7th)

Measure E ∑ = 78.8 (3rd)

Measure F ∑ = 76.6 (5th)

Measure G ∑ = 77.7 (4th)

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Also by Inimbom Isang

Project

Appraisal of the Implementation of Sustainabilty Practices during Construction Phase of Building Projects in Akwa Ibom State (2016). M.Sc Dissertation, Department of Building, Faculty of Environmental Studies, University of Uyo.
Available at: https://independentresearcher.academia.edu/InimbomIsang

Journals

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